Notice of Allowability	Application No. 10/762,396	Applicant(s) HEILENBACH ET AL.	
	Examiner Kandasamy Thangavelu	Art Unit 2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *January 17, 2007*.
2. ☒ The allowed claim(s) is/are *1-12,17-20*.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
   1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☒ Other *Clean copy of Allowed Claims*.

DETAILED ACTION

Introduction

1. This communication is in response to the Applicants' communication dated January 17, 2007. Claims 1, 2, 14 and 17 were amended. Claims 1-20 of the application are pending.

Examiner's Amendment

2. Authorization for this examiner's amendment was given in a telephone conversation by Mr. Panasarn Aim Jirut on June 5, 2007.

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to the applicants, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

3. In the claims:

Replace Claims 1-12 with:

1. A method for fabrication of a diesel engine turbocharger turbine stage, comprising the steps of:

selecting a set of discrete throttle settings for the engine, wherein the selected discrete throttle settings correlate to discrete rotational speeds of the turbocharger;

modeling the turbocharger for the engine, including modeling of the turbine stage thereof for vibration analysis, said modeling of the turbine stage further comprising modeling of turbine blades of a turbine wheel and modeling turbine nozzle vanes;

determining one or more natural frequencies of vibration of the turbine blades for each of the throttle settings;

determining a turbine nozzle vane induced turbine blade excitation frequency as a function of the turbocharger rotational speed at that throttle setting; and

ascertaining whether a data coincidence is present at each of the throttle settings, said step of ascertaining comprising determining whether, at the rotational speed corresponding to that throttle setting, there is a data coincidence of said one or more natural frequencies of vibration and said turbine nozzle vane induced turbine blade excitation frequency;

wherein if there is an absence of said data coincidence at each of the throttle settings, the turbine stage fabricated according to said step of ascertaining will have turbine blades which are at least substantially free of harmonically resonant vibrations at the discrete rotational speeds of the turbocharger.

2. The method of Claim 1, wherein the data coincidence comprises a predetermined range of proximity of the rotational speed corresponding to each throttle setting, said one or more natural frequencies of vibration at that throttle setting, and said turbine nozzle vane induced turbine blade excitation frequency at that throttle setting.

3. The method of Claim 2, further comprising fabricating the turbocharger according to said step of ascertaining whether a data coincidence is present at each of the throttle settings for the engine, wherein said step of ascertaining indicates that the turbocharger is free of said data coincidence at each of the throttle settings, indicating absence of harmonically resonant vibrations at the discrete rotational speeds of the turbocharger.

4. A turbocharger turbine stage for a diesel engine fabricated such that it is free of harmonically resonant vibrations at a set of discrete rotational speeds of the turbocharger corresponding to a set of discrete throttle settings for the engine, wherein an absence of harmonically resonant vibrations at discrete rotational speeds is determined by a method comprising:

selecting the set of discrete throttle settings for the engine, wherein the selected discrete throttle settings correlate to discrete rotational speeds of the turbocharger;

modeling the turbocharger for the engine, including modeling of the turbine stage thereof for vibration analysis, said modeling of the turbine stage further comprising modeling of turbine blades of a turbine wheel and modeling turbine nozzle vanes;

determining one or more natural frequencies of vibration of the turbine blades for each of the throttle settings;

determining a turbine nozzle vane induced turbine blade excitation frequency as a function of the turbocharger rotational speed at that throttle setting; and

ascertaining whether a data coincidence is present at each of the throttle settings, said step of ascertaining comprising determining whether, at the rotational speed corresponding to that throttle setting, there is a data coincidence of said one or more natural frequencies of vibration and said turbine nozzle vane induced turbine blade excitation frequency;

wherein if there is an absence of said data coincidence at each of the throttle settings, the turbine stage fabricated according to said step of ascertaining will have turbine blades which are at least substantially free of harmonically resonant vibrations at the discrete rotational speeds of the turbocharger.

5. The method of Claim 6, further comprising repeating:

the step of modeling, wherein the repeating of said step of modeling comprises remodeling of turbine blades of the turbine wheel for vibration analysis;

the step of determining one or more natural frequencies of vibration of the turbine blades for each of the throttle settings;

the step of determining the turbine nozzle vane induced turbine blade excitation frequency as a function of the turbocharger rotational speed at that throttle setting;

the step of ascertaining whether a data coincidence is present at each of the throttle settings; and

the step of modifying at least one of configuration and material composition of the turbine blades;

until the absence of data coincidence at the rotational speed corresponding to each throttle setting is obtained.

6. The method of Claim 2, wherein when a presence of any data coincidence is determined by the step of ascertaining, modifying at least one of configuration and material composition of the turbine blades.

7. The method of Claim 2, further comprising fabricating the turbocharger according to said step of ascertaining whether a data coincidence is present at each of the throttle settings for the engine, wherein:

when a presence of any data coincidence is determined by the step of ascertaining, modifying at least one of configuration and material composition of the turbine blades; and

repeating:

the step of modeling, wherein the repeating of said step of modeling comprises remodeling of turbine blades of the turbine wheel for vibration analysis;

the step of determining one or more natural frequencies of vibration of the turbine blades for each of the throttle settings;

the step of determining the turbine nozzle vane induced turbine blade excitation frequency as a function of the turbocharger rotational speed at that throttle setting;

the step of ascertaining whether a data coincidence is present at each of the throttle settings; and

the step of modifying at least one of configuration and material composition of the turbine blades;

until the absence of data coincidence at the rotational speed corresponding to each throttle setting is obtained.

8. A turbocharger turbine stage for a diesel engine fabricated such that it is free of harmonically resonant vibrations at a set of discrete rotational speeds of the turbocharger corresponding to a set of discrete throttle settings for the engine, wherein an absence of harmonically resonant vibrations at discrete rotational speeds is determined by a method comprising:

selecting the set of discrete throttle settings for the engine, wherein the selected discrete throttle settings correlate to discrete rotational speeds of the turbocharger;

modeling the turbocharger for the engine, including modeling of the turbine stage thereof for vibration analysis, said modeling of the turbine stage further comprising modeling of turbine blades of a turbine wheel and modeling turbine nozzle vanes;

determining one or more natural frequencies of vibration of the turbine blades for each of the throttle settings;

determining a turbine nozzle vane induced turbine blade excitation frequency as a function of the turbocharger rotational speed at that throttle setting; and

ascertaining whether a data coincidence is present at each of the throttle settings, said step of ascertaining comprising determining whether, at the rotational speed corresponding to that throttle setting, there is a data coincidence of said one or more natural frequencies of vibration and said turbine nozzle vane induced turbine blade excitation frequency;

wherein if there is an absence of said data coincidence at each of the throttle settings, the turbine stage fabricated according to said step of ascertaining will have turbine blades which are at least substantially free of harmonically resonant vibrations at the discrete rotational speeds of the turbocharger; and

wherein when a presence of any data coincidence is determined by the step of ascertaining,

modifying at least one of configuration and material composition of the turbine blades; and

repeating:

the step of modeling, wherein the repeating of said step of modeling comprises remodeling of turbine blades of the turbine wheel for vibration analysis;

the step of determining one or more natural frequencies of vibration of the turbine blades for each of the throttle settings;

the step of determining the turbine nozzle vane induced turbine blade excitation frequency as a function of the turbocharger rotational speed at that throttle setting;

the step of ascertaining whether a data coincidence is present at each of the throttle settings; and

the step of modifying at least one of configuration and material composition of the turbine blades;

until the absence of data coincidence at the rotational speed corresponding to each throttle setting is obtained.

9. The method of Claim 2, wherein said step of modeling further includes selecting a number of said turbine nozzle vanes; further when a presence of any data coincidence is determined by the step of ascertaining, further changing the number of said turbine nozzle vanes and remodeling turbine nozzle vanes.

10. The method of Claim 9, wherein the step of remodeling of the turbine nozzle vanes further includes selecting an odd, prime number of turbine nozzle vanes.

11. The method of Claim 2, further comprising fabricating the turbocharger according to said step of ascertaining whether a data coincidence is present at each of the throttle settings for the engine, wherein:

when a presence of any data coincidence is determined by the step of ascertaining, changing the number of said turbine nozzle vanes and remodeling turbine nozzle vanes such that there are no harmonically resonant vibrations at the discrete rotational speeds of the turbocharger corresponding to discrete throttle settings of the diesel engine;

wherein an odd, prime number of turbine nozzle vanes is selected when changing the number of said turbine nozzle vanes.

12. A turbocharger turbine stage for a diesel engine fabricated such that it is free of harmonically resonant vibrations at a set of discrete rotational speeds of the turbocharger corresponding to a set of discrete throttle settings for the engine, wherein an absence of

harmonically resonant vibrations at discrete rotational speeds is determined by a method comprising:

selecting the set of discrete throttle settings for the engine, wherein the selected discrete throttle settings correlate to discrete rotational speeds of the turbocharger;

modeling the turbocharger for the engine, including modeling of the turbine stage thereof for vibration analysis, said modeling of the turbine stage further comprising modeling of turbine blades of a turbine wheel and modeling turbine nozzle vanes;

determining one or more natural frequencies of vibration of the turbine blades for each of the throttle settings;

determining a turbine nozzle vane induced turbine blade excitation frequency as a function of the turbocharger rotational speed at that throttle setting; and

ascertaining whether a data coincidence is present at each of the throttle settings, said step of ascertaining comprising determining whether, at the rotational speed corresponding to that throttle setting, there is a data coincidence of said one or more natural frequencies of vibration and said turbine nozzle vane induced turbine blade excitation frequency;

wherein if there is an absence of said data coincidence at each of the throttle settings, the turbine stage fabricated according to said step of ascertaining will have turbine blades which are at least substantially free of harmonically resonant vibrations at the discrete rotational speeds of the turbocharger; and

wherein when a presence of any data coincidence is determined by the step of ascertaining,

changing the number of said turbine nozzle vanes and remodeling turbine nozzle vanes such that there are no harmonically resonant vibrations at the discrete rotational speeds of the turbocharger corresponding to discrete throttle settings of the diesel engine;

wherein an odd, prime number of turbine nozzle vanes is selected when changing the number of said turbine nozzle vanes.

Cancel claims 13-16.

Replace claims 17-20 with:

17. A method for fabrication of a diesel engine turbocharger turbine stage, comprising the steps of:

selecting a set of discrete throttle settings for the engine, wherein the selected discrete throttle settings correlate to discrete rotational speeds of the turbocharger;

modeling the turbocharger for the engine, including modeling of the turbine stage thereof for vibration analysis, said modeling of the turbine stage further comprising modeling of turbine blades of a turbine wheel and modeling turbine nozzle vanes,;

determining one or more natural frequencies of vibration of the turbine blades for each of the throttle settings;

determining a turbine nozzle vane induced turbine blade excitation frequency as a function of the turbocharger rotational speed at that throttle setting; and

ascertaining whether a data coincidence is present at each of the throttle settings, said step of ascertaining comprising determining whether, at the rotational speed corresponding to that

throttle setting, there is a data coincidence of said one or more natural frequencies of vibration and said turbine nozzle vane induced turbine blade excitation frequency;

wherein the data coincidence comprises a predetermined range of proximity of the rotational speed corresponding to each throttle setting, said one or more natural frequencies of vibration at that throttle setting, and said turbine nozzle vane induced turbine blade excitation frequency at that throttle setting;

wherein if there is an absence of said data coincidence at each of the throttle settings, the turbine stage fabricated according to said step of ascertaining will have turbine blades which are at least substantially free of harmonically resonant vibrations at the discrete rotational speeds of the turbocharger; and

wherein when a presence of any data coincidence is determined by the step of ascertaining,

performing one of redesigning the turbine blades of the turbine wheel and redesigning turbine nozzle vanes;

wherein redesigning the turbine blades of the turbine wheel comprises:

modifying at least one of configuration and material composition of the turbine blades; and repeating:

the step of modeling, wherein the repeating of said step of modeling comprises remodeling of turbine blades of the turbine wheel for vibration analysis;

the step of determining one or more natural frequencies of vibration of the turbine blades for each of the throttle settings;

the step of determining the turbine nozzle vane induced turbine blade excitation frequency as a function of the turbocharger rotational speed at that throttle setting;

the step of ascertaining whether a data coincidence is present at each of the throttle settings; and

the step of modifying at least one of configuration and material composition of the turbine blades;

until the absence of data coincidence at the rotational speed corresponding to each throttle setting is obtained; and

wherein redesigning turbine nozzle vanes comprises:

changing the number of said turbine nozzle vanes and remodeling turbine nozzle vanes;

wherein the step of remodeling of the turbine nozzle vanes includes selecting an odd, prime number of turbine nozzle vanes.

18. The method of Claim 17, further comprising fabricating the turbocharger according to said step of ascertaining whether a data coincidence is present at each of the throttle settings for the engine, wherein said step of ascertaining indicates that the turbocharger is free of said data coincidence at each of the throttle settings, indicating absence of harmonically resonant vibrations at the discrete rotational speeds of the turbocharger.

19. The method of Claim 17, further comprising selecting a new throttle setting without encountering a data coincidence such that the turbocharger remains within a region of safe operation.

20. The method of Claim 19, further comprising fabricating the turbocharger according to said steps of redesigning, modeling and modifying, wherein said step of ascertaining indicates that the turbocharger is free of said data coincidence at each of the throttle settings, indicating absence of harmonically resonant vibrations at the discrete rotational speeds of the turbocharger.

A clean copy of the allowed claims is attached.

Reasons for Allowance

4. Claims 1-12 and 17-20 of the application are allowed over prior art of record.

5. The following is an Examiner's statement of reasons for the indication of allowable subject matter:

The closest prior art of record shows:

(1) in a turbocharger for an internal combustion engine, a turbine stage comprises a turbine chamber within which a turbine wheel is mounted; the turbine wheel has radially extending blades and is rotated by engine exhaust gas; nozzle vanes in the inlet passageway deflect the gas towards the direction of rotation of the turbine wheel; the nozzle vanes are stationary and do not rotate with the turbine wheel; the interaction of the rotating wheel blades with a stationary pressure field resulting from the nozzle ring is periodic in nature and at certain

rotation speeds corresponds to the resonant frequency of the blades in one or more modes of vibration; this sets up oscillations in blades; each vane has a trailing edge extending adjacent the turbine wheel blades; the trailing edge of the vane deviates from a straight line over a portion of its length; the deviation is provided in the form a discontinuity or curvature in the trailing edge, so it disturbs the pressure fields generated by the vanes and reduces the vibrations (**Garrett et al.,** U.S. Patent Application 2004/0101402);

(2) large locomotives use a diesel engine to drive an electric generation system to supply electric current to a plurality of direct current traction motors; the electric generation system comprises a 3-phase alternator whose rotor is mechanically coupled to the shaft of the engine; during propulsion mode, the diesel engine delivers constant power from the alternator to traction motors depending on the throttle setting of the engine and the ambient conditions, regardless of the locomotive speed; locomotive control systems are designed to allow the operator to select the desired level of traction power at discrete steps between zero and maximum; for regulating the engine power, a speed regulating governor is provided that adjusts the quantity of fuel injected into the engine cylinders; the desired speed is set by a manually operated lever or handle of a throttle that can be selectively moved in eight steps or notches between a low position and a maximum power position; the position of the throttle handle determines the engine speed setting of the associated governor; the throttle handle position defines the speed and load on the engine (**Dunsworth et al.,** U.S. Patent Application 2002/0175521);

(3) in a multi-stage turbo machinery, the interaction between the vane and the blade generates the excitation force on the blade; the fundamental frequency of excitation is the rotor speed multiplied by the vane count; if the natural frequency of the blade is coincident with the

frequency of excitation, the resonant stress of the blade becomes very large and may cause blade failure due to fatigue; asymmetric vane spacing can result in decreased levels of excitation at specific frequencies; an analysis method for predicting the excitation reduction due to asymmetric vane spacing using a 3-D CFD and modal analysis method based on 3-D FEM; time history wave of vibratory stress is predicted for both the symmetric and asymmetric vane spacings; a simple model of asymmetric vane spacing is used to examine the effect of vane count and blade damping on blade vibratory stress; vane count where the whole vanes are divided into two segments (upper and lower half) and the vane count in the upper and lower half is slightly altered is most practical, considering the cost of manufacturing and maintaining; the modal analysis technique is used to represent the vibration characteristics of each mode by the spring-mass system (**Kaneko et al.,** "Reduction of vibratory stress of compressor blade by use of asymmetric vane spacing", Proceedings of the International Gas turbine congress, 2003); and

(4) in a steam turbine intended for a thermal or nuclear power plant, moving blades of a rotor in the steam turbine vibrate as the rotor rotates; dependence of natural vibration frequencies of the blades on rotor speed; the Campbell diagram shows the relationship among the rotor speed, natural frequency of vibration and the excitation frequency of the blades; each of the intersections of the natural frequency lines with the excitation frequency lines corresponds to a resonant point of the steam turbine; the amplitude of vibration of the blade increases remarkably at the resonant point ; the steam turbine is designed so that the rated rotating speed does not coincide with the resonant point (**Namura et al.,** U.S. Patent Application 2002/00057969).

Additional state of the art reviewed and considered by the Examiner is found in U.S. Patent Application 2002/0057969; U.S. Patent 5,524,341; U.S. Patent 4,786,233; U.S. Patent Application 2004/0216457; U.S. Patent 5,307,632; U.S. Patent 6,557,347; U.S. Patent 5,224,457; U.S. Patent 6,094,989; U.S. Patent 4,292,531 and D.Filsinger et al., "Approach to unidirectional coupled CFD-FEM analysis of axial turbocharger turbine blades", Journal of turbomachinery, January 2002.

None of these references taken either alone or in combination with the prior art of record discloses a method for fabrication of a diesel engine turbocharger turbine stage, specifically including:

(Claim 1) "selecting a set of discrete throttle settings for the engine, wherein the selected discrete throttle settings correlate to discrete rotational speeds of the turbocharger;

determining one or more natural frequencies of vibration of the turbine blades for each of the throttle settings;

determining a turbine nozzle vane induced turbine blade excitation frequency as a function of the turbocharger rotational speed at that throttle setting; and

ascertaining whether a data coincidence is present at each of the throttle settings, said step of ascertaining comprising determining whether, at the rotational speed corresponding to that throttle setting, there is a data coincidence of said one or more natural frequencies of vibration and said turbine nozzle vane induced turbine blade excitation frequency".

None of these references taken either alone or in combination with the prior art of record discloses a turbocharger turbine stage for a diesel engine fabricated such that it is free of harmonically resonant vibrations at a set of discrete rotational speeds of the turbocharger corresponding to a set of discrete throttle settings for the engine, specifically including:

(Claim 4) "selecting a set of discrete throttle settings for the engine, wherein the selected discrete throttle settings correlate to discrete rotational speeds of the turbocharger;

determining one or more natural frequencies of vibration of the turbine blades for each of the throttle settings;

determining a turbine nozzle vane induced turbine blade excitation frequency as a function of the turbocharger rotational speed at that throttle setting; and

ascertaining whether a data coincidence is present at each of the throttle settings, said step of ascertaining comprising determining whether, at the rotational speed corresponding to that throttle setting, there is a data coincidence of said one or more natural frequencies of vibration and said turbine nozzle vane induced turbine blade excitation frequency".

None of these references taken either alone or in combination with the prior art of record discloses a turbocharger turbine stage for a diesel engine fabricated such that it is free of harmonically resonant vibrations at a set of discrete rotational speeds of the turbocharger corresponding to a set of discrete throttle settings for the engine, specifically including:

(Claim 8) "selecting a set of discrete throttle settings for the engine, wherein the selected discrete throttle settings correlate to discrete rotational speeds of the turbocharger;

determining one or more natural frequencies of vibration of the turbine blades for each of the throttle settings;

determining a turbine nozzle vane induced turbine blade excitation frequency as a function of the turbocharger rotational speed at that throttle setting; and

ascertaining whether a data coincidence is present at each of the throttle settings, said step of ascertaining comprising determining whether, at the rotational speed corresponding to that throttle setting, there is a data coincidence of said one or more natural frequencies of vibration and said turbine nozzle vane induced turbine blade excitation frequency".

None of these references taken either alone or in combination with the prior art of record discloses a turbocharger turbine stage for a diesel engine fabricated such that it is free of harmonically resonant vibrations at a set of discrete rotational speeds of the turbocharger corresponding to a set of discrete throttle settings for the engine, specifically including:

(Claim 12) "selecting a set of discrete throttle settings for the engine, wherein the selected discrete throttle settings correlate to discrete rotational speeds of the turbocharger;

determining one or more natural frequencies of vibration of the turbine blades for each of the throttle settings;

determining a turbine nozzle vane induced turbine blade excitation frequency as a function of the turbocharger rotational speed at that throttle setting; and

ascertaining whether a data coincidence is present at each of the throttle settings, said step of ascertaining comprising determining whether, at the rotational speed corresponding to that

throttle setting, there is a data coincidence of said one or more natural frequencies of vibration and said turbine nozzle vane induced turbine blade excitation frequency".

None of these references taken either alone or in combination with the prior art of record discloses a method for fabrication of a diesel engine turbocharger turbine stage, specifically including:

(Claim 17) "selecting a set of discrete throttle settings for the engine, wherein the selected discrete throttle settings correlate to discrete rotational speeds of the turbocharger;

determining one or more natural frequencies of vibration of the turbine blades for each of the throttle settings;

determining a turbine nozzle vane induced turbine blade excitation frequency as a function of the turbocharger rotational speed at that throttle setting; and

ascertaining whether a data coincidence is present at each of the throttle settings, said step of ascertaining comprising determining whether, at the rotational speed corresponding to that throttle setting, there is a data coincidence of said one or more natural frequencies of vibration and said turbine nozzle vane induced turbine blade excitation frequency".

6. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Kandasamy Thangavelu whose telephone number is 571-272-3717. The examiner can normally be reached on Monday through Friday from 8:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Rodriguez, can be reached on 571-272-3753. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to TC 2100 Group receptionist: 571-272-2100.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

K. Thangavelu
Art Unit 2123
June 5, 2007